



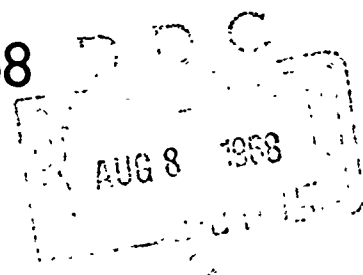
AD 672344

U.S. ARMY Research & Development Information Program

FY 1968 - FY 1972

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June 1968



**U.S. Army Research Office
Office, Chief of Research and Development
Washington, D.C. 20310**

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U.S. ARMY
RESEARCH & DEVELOPMENT
INFORMATION PROGRAM

FY68 - FY72

COLONEL DALE L. VINCENT

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JUNE 1968

U.S. ARMY RESEARCH OFFICE
OFFICE, CHIEF OF RESEARCH AND DEVELOPMENT
WASHINGTON, D.C. 20310

This report updates the U.S. Army Scientific and Technical Information Program Report dated December 1966.

Comments or suggestions concerning the U.S. Army Research and Development Information Program may be submitted on DA Form 1598 (copy inclosed next to last page), and addressed to:

The Chief of Research and Development
ATTN: CRDSTI
Hqs, Department of the Army
Washington, D. C. 20310

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	
1.1 Program Initiation, Bases & Scope	7
1.2 Purpose, Objectives & Guidelines	8
1.3 Value & Benefits	9
1.4 Basic Concept	12
1.5 Interrelationship of Projects	13
2. ARMY RESEARCH & DEVELOPMENT INFORMATION PROJECTS	
2.1 Army Technical Library Improvement Studies (ATLIS)	17
2.2 Symposia & Conferences (SC)	20
2.3 Chemical Information & Data System (CIDS)	23
2.4 Engineering Data Storage & Retrieval (EDSR)	25
2.5 Information & Data Exchange Experimental Activities (IDEEA)	27
2.6 Technical Information Functions & Activities (TIFA)	29
2.6.1 Technical Information & Analysis Centers (TIAC)	29
2.6.2 Army Research & Development Information System (ARDIS)	31

LIST OF FIGURES

	<u>Page</u>
Figure 1. Survey of Army Scientific & Technical Information Functions & Activities	10
Figure 2. Relative Cost of Army Research and Development Information Program	11
Figure 3. Three-dimensional Approach to Scientific & Technical Information Management	14
Figure 4. Three-dimensional Approach to Army Research & Development Information Program	15
Figure 5. Army Research and Development Information System	32

APPENDICES

A. BIBLIOGRAPHY	35
B. MILESTONE CHARTS	55
C. FUNDING	63

1. INTRODUCTION

1.1 Program Initiation, Bases & Scope.

The Army Research and Development Information Program was initiated by an April 1962 action of the Chief of Research and Development which established an Army Ad Hoc Group on Scientific and Technical Information. Twenty-three problem areas were identified in such areas as identification of information resources; vocabulary, indexing and dissemination; bibliographies and literature search; management requirements for scientific information; information flow; information generation; conferences, meetings and symposia; and training.

The report of the Ad Hoc Group contained 23 staff studies and 105 recommendations. It was used as the basis for the preparation of the first Army Five-Year Scientific and Technical Information Program. The original program was staffed and forwarded to the Deputy Secretary of Defense (OSD) in January 1963. The Army Program was approved by Memorandum of the Office of the Secretary of Defense on 8 February 1963, as the Army portion of the Defense Program. Meanwhile, the Defense Scientific and Technical Information Program was launched by a memorandum of 3 October 1963 from the Deputy Secretary of Defense, followed by DoD Directive 5100.36 dated December 31, 1962, and DoD Instruction 5129.43 dated January 22, 1963.

The basic general regulation for the Army Program is Army Regulation 70-45 dated 18 August 1965. Specific aspects of the Program are covered by the following ARs:

1. AR 70-9 dated 24 May 1966, Research and Technology Resume¹ Work Unit Level.
2. AR 70-11 dated 8 October 1965, Defense Documentation Center for Scientific and Technical Information.
3. AR 70-14 dated 13 February 1963, Payments of Costs of Reprints of Articles in Professional Journals.
4. AR 70-21 dated 21 February 1966, Certification for Access to Scientific and Technical Information.
5. AR 70-22 dated 14 January 1965, Centers for Analysis of Scientific and Technical Information.
6. AR 70-26 dated October 1963, Research & Development Symposia, Conferences, and Technical Meetings.
7. AR 70-31 dated 9 September 1966, Standards for Technical Reporting.

DoD Directives and Instructions covering the DoD Program are:

1. DoD Directive 5100.36 dated December 31, 1962, Department of Defense Technical Information.
2. DoD Instruction 5129.43, dated January 22, 1963, Assignment of Functions for the Defense Scientific and Technical Information Program.
3. DoD Instruction 5100.38 dated March 29, 1965, Defense Documentation Center for Scientific and Technical Information (DDC).
4. DoD Instruction 5100.45 dated July 28, 1964, Centers for Analysis of Scientific and Technical Information.
5. DoD Instruction 3200.8 dated March 7, 1966, Standards for Documentation of Technical Reports under the DoD Scientific and Technical Information Program.

1.2 Purpose, Objectives and Guidelines.

The purposes of the Army Research & Development Information Program are to insure continuous effective exchange and availability of scientific and technical information and to preclude unnecessary expenditure of resources, make optimum use of existing resources, reduce lead time, and make more effective use of advanced technology. It provides guidance and direction for control and improvement of the acquisition, evaluation, storage, retrieval and dissemination of scientific and technical information.

The objectives of the Program are to:

1. Develop policy and guidance based on a current inventory of scientific and technical information functions and activities.
2. Develop concepts for the Army Research and Development Information Program, establish information requirements, and initiate programs for proper acquisition, evaluation, storage, retrieval and dissemination of the information.
3. Provide programming, budgeting, funding, accounting, reporting and support functions for projects comprising the Army Research and Development Information Program.
4. Utilize advanced techniques for improving effectiveness and availability of scientific and technical information.
5. Secure economies by eliminating unnecessary duplication of work in RDT&E and related areas, and by providing timely, relevant and comprehensive scientific and technical information.

6. Provide for adequate exchange of scientific and technical information.

The Program conforms to the following general guidelines:

1. Maximum use is made of existing scientific or technical information facilities and resources.

2. Scientific and technical information services and activities, system design, file building, and technical systems experimentation are directed toward support of Army in-house work, with specific emphasis on priority Army projects.

3. New requirements for technical information and data systems are examined relative to general and specific Army requirements.

1.3 Value and Benefits.

The Army Research and Development Information Program is responsive to the needs of Army scientific, technical and management personnel and it supports the overall Army mission. The basic objective of the Program is to improve the cost-effectiveness of scientific and technical information from source to user in support of scientific, technical and related activities.

The FY 68 Army Research and Development budget totals approximately \$1.5 billion dollars. Based on a survey, it has been estimated that current annual costs for transferring scientific and technical information from source to user within the Army are at least \$75,000,000, or about 5% of the total R&D budget. These expenditures are related to the operation of 180 technical organizations at 50 world-wide locations, which perform 140 types of data handling operations involving approximately 387 substantial holdings of technical data. Compared with this expenditure, the amount being spent under the Army Research and Development Information Program to develop improved techniques in information handling is approximately \$1.5 million dollars, i.e., 2% of the scientific and technical information transfer costs, or one-tenth of one percent of the total R&D budget (Figures 1 and 2).

The direct benefits to the Army that will be obtained from improvements in data handling provided by information systems research and development conducted by the Army Research and Development Information Program are the following:

- Reduction of information search time.
- Improvement of reliability of information.
- Improvement of efficiency of collection, storage, retrieval and dissemination of information.

SURVEY OF ARMY SCIENTIFIC AND TECHNICAL
INFORMATION FUNCTIONS AND ACTIVITIES

1. 180 TECHNICAL ORGANIZATIONS AT 50 WORLDWIDE LOCATIONS.
2. 140 TYPES OF DATA HANDLING FUNCTIONS DIVIDED INTO 6 CATEGORIES:
 - a. COLLECTING
 - b. EVALUATING
 - c. INDEXING
 - d. STORING
 - e. RETRIEVING
 - f. DISTRIBUTING
3. 387 SUBSTANTIAL HOLDINGS OF TECHNICAL DATA DETERMINED BY:
 - a. SIZE OF HOLDING TO EXCEED 16,000,000 CHARACTERS.
 - b. MAINTAINING ORGANIZATION HAS R&D MISSION REQUIREMENT IN AREA.
 - c. HOLDINGS ARE MADE AVAILABLE OUTSIDE THE PREPARING ORGANIZATION.
 - d. MATERIAL IS MAINTAINED BY A RESPONSIBLE TECHNICAL SPECIALIST.
4. ANNUAL COST OF \$75,000,000 TO TRANSFER DATA NOT INCLUDING COST OF TECHNICAL PERSONNEL SEARCH TIME.
5. ANNUAL COST OF \$1,500,000 TO PROVIDE INCREASED EFFECTIVENESS OF DATA TRANSFER FROM SOURCE TO USER.

FIGURE 1

RELATIVE COST OF ARMY RESEARCH AND
DEVELOPMENT INFORMATION PROGRAM

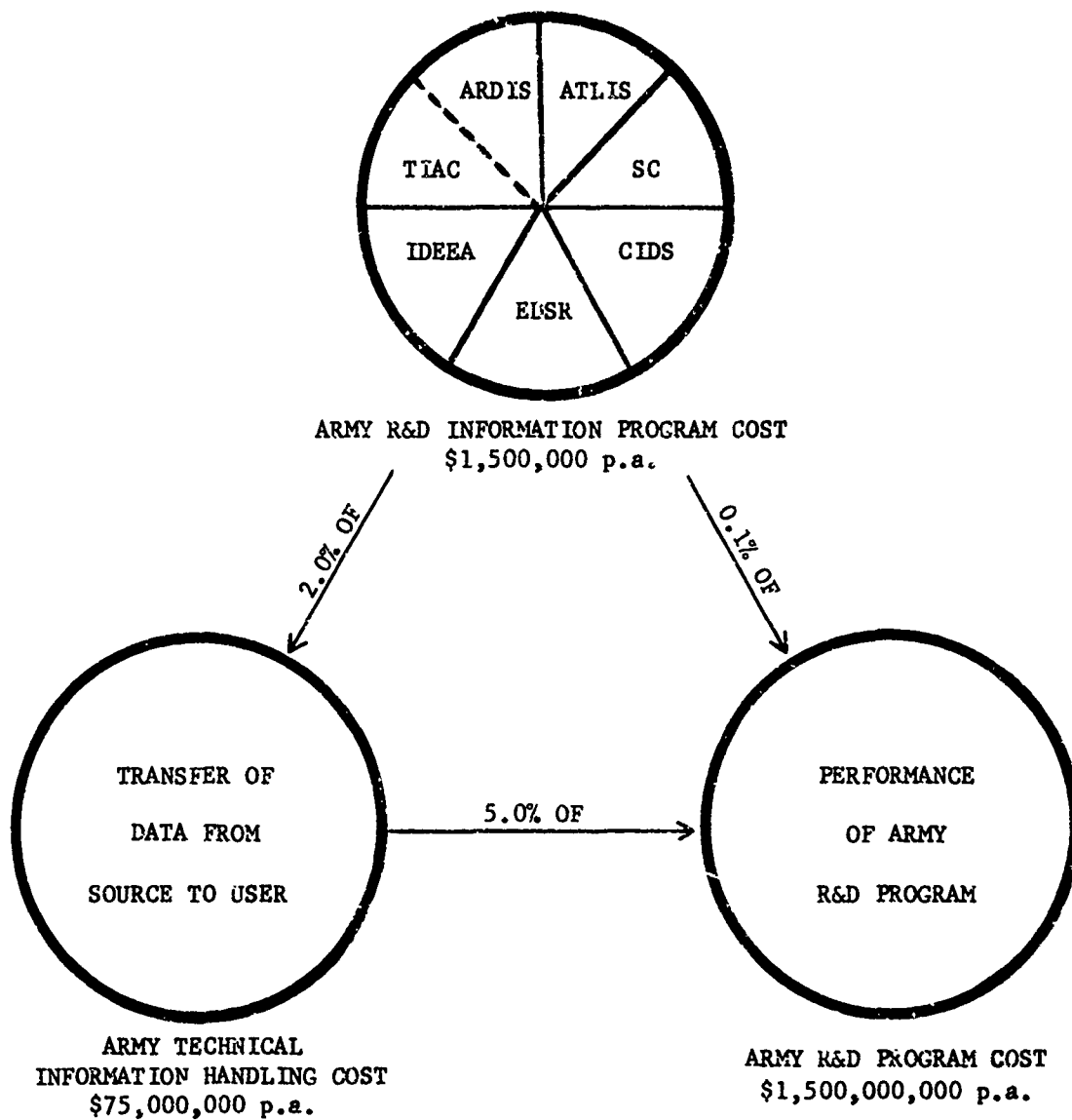


FIGURE 2

Reduction of Language difficulties impeding information transfer.
Reduction of excessive or deficient responses to information queries.
Delivery of information in proper form.
Improvement of relevancy of information.
Improvement of communication of information.

The indirect benefits are the following:

Shortening of RDT&E time cycle.
Elimination of undesirable duplications of RDT&E effort.
Reduction of false starts in RDT&E programs.
Reduction of RDT&E costs.
Improvement of RDT&E technical management.
Improved information support to logistics and other programs.

1.4 Basic Concept

Before research and development scientists and engineers attack new problems, they must insure that a requirement for the work exists and they must make a thorough study of available information relevant to the problem. This requires a responsive information system. Furthermore, research and development work in progress must be continuously evaluated to insure proper coordination and prevent duplication with related or similar efforts. This also requires an effective information system. Finally, completed work must be reported and the results disseminated, again requiring an effective information system. The Army R&D Information Program is geared to meet these requirements by effectively coupling information sources to Army information users. This includes policy and guidance for interchange of R&D technical and management information and projects for the development of improved information systems. Appropriate attention is given to document retrieval systems, fact retrieval systems, and the broad application of modern techniques to the solution of problems in information interchange.

A three-dimensional approach to information management is used, applying fundamental principles of resource management. (Data is in fact a basic resource, as are men, money and materiel.) When applying these data management techniques, one must first insure that all data of interest has been properly classified, that is, clearly labeled so that there is no question about what data is being sought, is being stored, or is being processed. The classification of information involves names of data elements; subject disciplines, like chemistry, physics, and aerodynamics; and materiel names. Second, attention must be given to the way information is represented, like data media, forms, formats, languages, and codes. Speaking loosely, one might refer to this as "data packaging," that is, how it's represented on such media as hard copy, punched cards, microfilm, microfiche, microimage; or what formats, like books, journals, technical reports, or abstracts are used. The United States of America

Standards Institute defines data as a representation to which meaning is or might be assigned. Of third concern to a user of information are the operations that need to be performed on data. Such data operations are collection, evaluation, indexing, storage, search, retrieval, and dissemination.

Thus, the three fundamental approaches to information management are information classification, information representation, and information operations. These are in order of importance to the data seeker, or user, and the data source. To data systems personnel, the order of importance is reversed. Figure 3 illustrates this three-dimensional approach to scientific and technical information management, and Figure 4 shows its application to the Army R&D Information Program. Note that the three approaches are interdependent. One cannot deal with one approach without addressing the other two at the same time.

1.5 Interrelationship of the Army R&D Information Projects.

The primary purpose of the Army R&D Information Program is to improve the cost-effectiveness of transfer of technical information from sources to users. Each project within the program is designed to improve current ways and means of technical data interchange or to devise new and improved systems and procedures to provide the basis for better control and management. Because each project attacks a different part of the overall problem of improving technical data interchange, the projects must be fully coordinated.

The first way of arriving at more effective data interchange, dividing the problem of improving data interchange by technical subject or disciplines, has led to the establishment of a set of discipline-oriented efforts, such as the Chemical Information and Data System (CIDS), the Engineering Data Storage and Retrieval (EDSR), and the Technical Information Analysis Centers (TIAC). By encompassing the entire spectrum of technical subjects, coverage can be extended to all forms of data as well as to all methods of data handling.

The second way of improving data interchange is by examination of problems related to the data forms, data carriers, or data media, i.e., the technical reports, engineering drawings, microfilms, magnetic tapes, optical readers, combinational logic circuitry, and those yet to be developed. Each project considers problems of data format, media, or carrier as exemplified by a chemical symbol generator or chemical typewriter in CIDS or by microfilm chips, video tapes, or microfiche in EDSR or the Army Technical Library Improvement Studies (ATLIS) project.

The third way of arriving at more effective data interchange is to examine, analyze and improve the operations being performed, such as

THREE-DIMENSIONAL APPROACH TO SCIENTIFIC
AND TECHNICAL INFORMATION MANAGEMENT

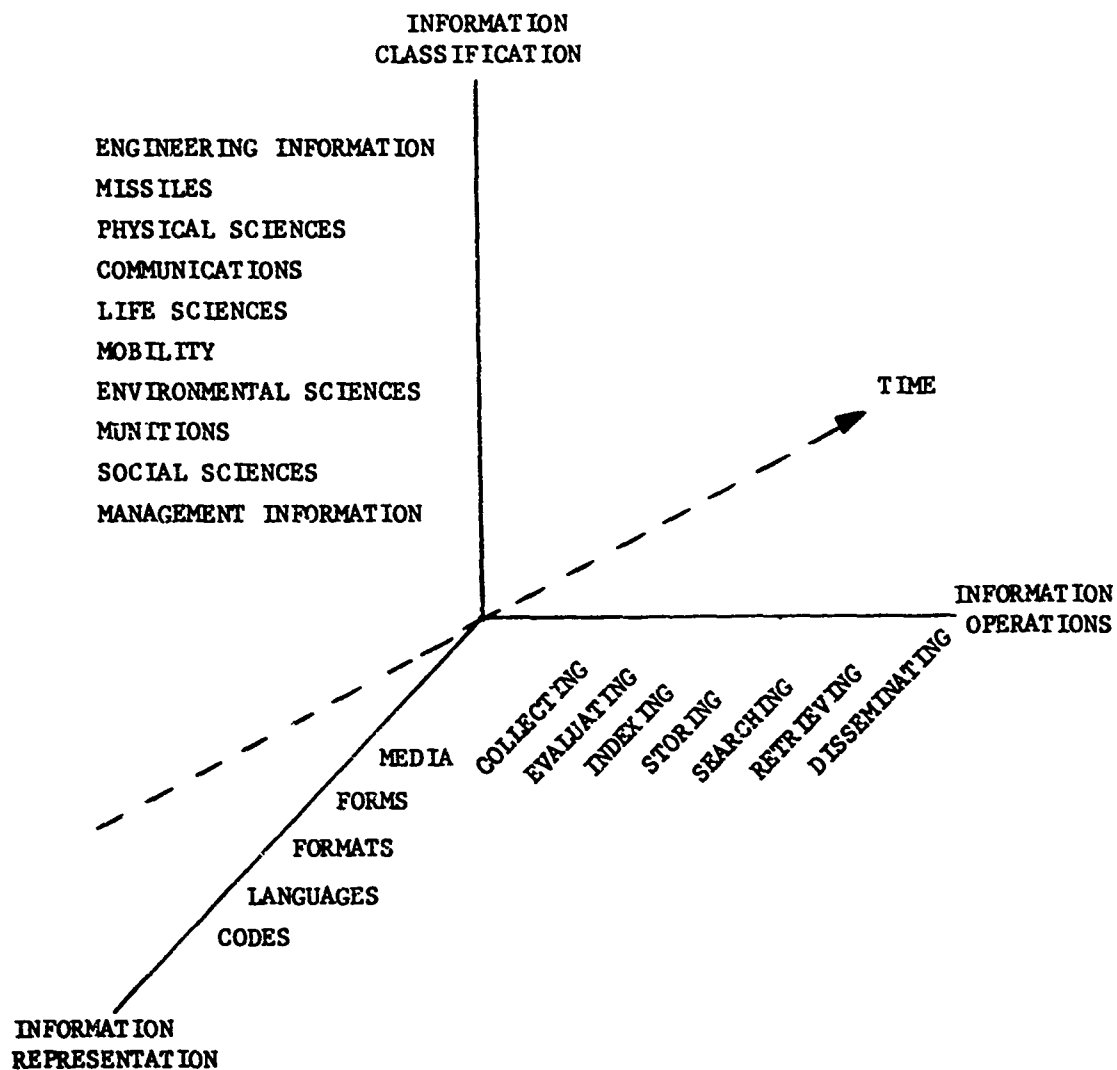


FIGURE 3

THREE-DIMENSIONAL APPROACH TO ARMY
RESEARCH AND DEVELOPMENT INFORMATION PROGRAM

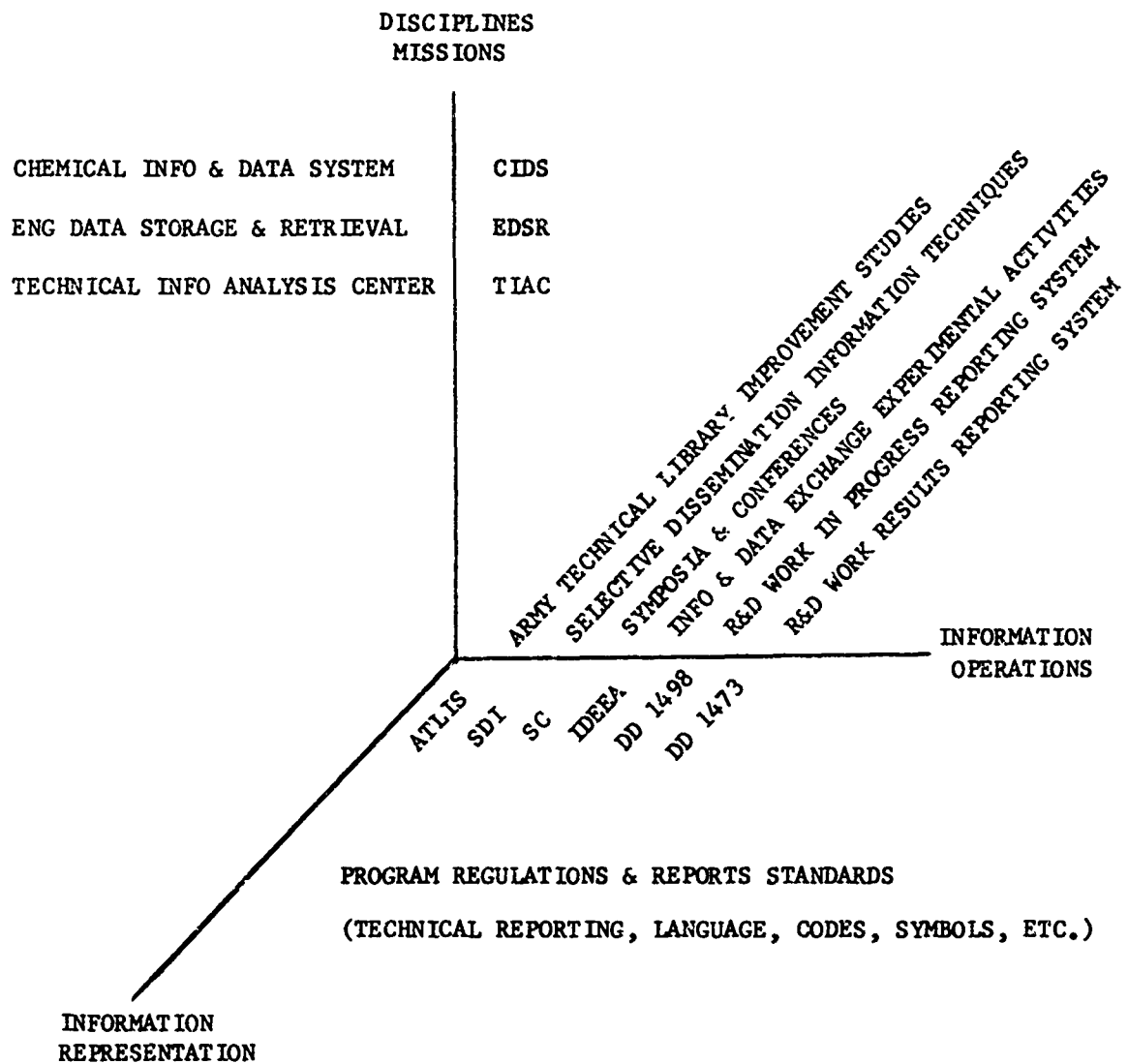


FIGURE 4

indexing, cataloging, storing, translating and abstracting, regardless of the disciplines and form of the data. ATLIS, the Symposia and Conference (SC), and the Information Data Exchange Experimental Activities (IDEEA) are examples of projects oriented toward improvement of the ways and means of communication, processing, or operating on data.

This three-way approach to an information management provides complete coverage, by giving consideration to all aspects of the total information management problem. However, great care and coordination of work units is required. Each step forward in any one project affects all projects regardless of the type of problem approach. For example, a new microimage process might have an effect on the storage and retrieval of engineering as well as other types of data. Thus, the data medium, the data process, and the data discipline are involved, and the projects are mutually interdependent.

Another example of the mutual interdependence of the projects can be seen in the relationships between the Technical Information Functions and Activities (TIFA), the DD Form 1498 Research and Technology Resume Reporting System, and the DD Form 1473 reports. They describe the RDT&E work-in-progress, the results of RDT&E, the scientific and technical information exchange functions and activities in support of the work, and the information needs of the technical personnel doing the work. The data base provided by these three systems will assist in the management of the Army R&D Information Program and provide support for the technical management of the RDT&E effort. These systems have now been incorporated as subsystems of the Army Research and Development Information System (ARDIS).

2. ARMY RESEARCH & DEVELOPMENT INFORMATION PROJECTS

2.1 Army Technical Library Improvement Studies (ATLIS)

2.1.1 Purpose, Objective and Scope

The Army Technical Library Improvement Studies (ATLIS) is an exploratory development project designed to develop dynamic and coordinated technical library operations for the purpose of improving service to Army scientists and engineers.

2.1.2 Basic Concept

To establish the administrative and management policies and responsibilities for Department of the Army elements participating in the Army Technical Library Improvement Studies (ATLIS) project. To provide guidelines for the preparation and submission of technical reports.

2.1.3 Task Areas

There are four principal areas of effort:

1. Management and Technical Direction - To provide management and technical direction for the ATLIS project, to include the development of the overall project concept and objectives, the identification of problem areas, the coordination of objectives and resources requirements, and the maintenance of liaison with other projects in the Army R&D Information Program.

2. Library Operations - To achieve improved operation of technical libraries and network relationships, through standardization of activities and regulatory controls where applicable.

3. Library Services - To develop improved services of technical libraries, to include speed, accuracy, comprehensiveness, selectivity, suitability, brevity, control and timeliness of response, through development of manuals, guidelines, and regulations on internal distribution of publications and new reports, pre-announcement and advance abstracts, inter-library relations, classified document control, obtaining translations, and automation aids.

4. Advanced Technology - To assemble new information on trends in changing systems and technology, advancement in automation, communications and linguistics, improved equipments or applications, to serve as guides in planning the library improvement project and evaluating the practicality of results emerging from studies of operations and services.

2.1.4 Administration and Management

Office, Chief of Research and Development, CRDSTI, programs and

provides funds for ATLIS, and maintains staff supervision of the project.

Management and execution responsibility for the ATLIS project is assigned to the Office, Chief of Engineers, ENGAS-I, subject to the approval of Office, Chief of Research and Development, CRDSTI, and the concurrence of the major commands involved.

2.1.5 Accomplishments

1. Technical Library User's Guide Booklets prepared (Ref. 1, 2) and consolidated into DA pamphlet. The pamphlet provides a description of the resources, services and tools available to users or potential users of scientific and technical information through the Army technical libraries, related technical information centers, information analysis centers and other libraries.

2. Criteria for Technical Library Operational Standards developed (Ref. 3). An extensive search has been made in the library and management sciences to determine the standards and methods currently in existence for the evaluation of the efficiency and the effectiveness of library services and operations.

3. Technical Library Automation Workshop conducted (Ref. 4, 5, and 6). A workshop was held on Automation in Libraries at Redstone Scientific Information Center (RSIC), 15-17 November 1966. The purpose of the workshop was to acquaint Army librarians with some of the developments in the field of automation in libraries closely related to their everyday working environments and to help them gain awareness of how automation has been applied.

4. Selective Dissemination of Information (SDI) studies conducted (Ref. 7, 8 and 9). A study was made to develop the most effective method for dissemination of technical information in Army installations consistent with available manpower and funds. The Phase I report (Ref. 7) is a detailed review of eighteen small-scale, intermediate-scale, and large-scale selective dissemination systems (SDI). The Phase II report (Ref. 8) presents the results of the pilot test of a prototype SDI system in which 1000 documents were cataloged, indexed, and disseminated to 25 scientific and technical personnel. The final report (Ref 9) is a manual and set of guidelines for implementing and operating a replica of the prototype SDI system.

5. Guide to Laws and Regulations on Federal Libraries issued (Ref. 10). A guide has been prepared on contract with the Library of Congress to provide guidance to Army technical libraries as to the available regulatory publications which affect federal library operations, including DoD Directives, ASPRs, ARs, and TAG letters.

6. Interlibrary Mutual Support Study conducted (Ref. 11). A study has been made to determine how Army technical libraries and their users can take advantage of services available at other libraries, permitting and encouraging mutual support through the exchange of services, particularly in the areas of inter-loan service, procurement, circulation, experience and specialized collections.

7. Cost-Effectiveness Study, applied to Document Processing, conducted (Ref. 12). This study identifies and defines parameters of an economical and practical information system, which include data requirements definition; cost analysis and system identification; hardware selection, system test and evaluation; and development of software.

8. Classified Information Handling Study conducted (Ref. 13). A review of the literature concerning classified information provides a consideration of policies, practices, problems of distribution, inter-library cooperation, security fundamentals, and an analysis of the findings.

9. Multidimensional Indexing Study, conducted (Ref. 14). A study has been made to develop and experimentally operate an "Approach by Concept" (ABC) document storage and retrieval method for application in library systems. A report has been published on the multiple testing of the method and the development of a second-generation mathematical model.

2.2 Symposia & Conferences (SC)

2.2.1 Purpose, Objective & Scope

The Symposia and Conference (SC) project provides DA staff supervision for Army sponsorship and cosponsorship of all scientific and technical conferences and symposia. The project also provides funds for support of scientific and technical symposia and conferences which exceed the funding ability of proponent subordinate commands and agencies as well as interdisciplinary conferences broad enough in scope to be of general interest to the R&D community. Included in the latter category is support of science youth activities.

2.2.2 Basic Concept

1. Conferences are an essential means for scientific investigators to review new accomplishments and techniques within their fields. Conferences foster exchange of ideas and information and permit Army scientists to maintain rapport with civilian colleagues, and with key military and civilian leaders of DoD and the government.

2. Science youth activities are sponsored by the Army in conjunction with other DoD agencies, civilian government agencies, industrial organizations and institutions of higher learning. Their purpose is to encourage high school students to establish themselves in scientific or technical vocations.

2.2.3 Task Areas

1. Army Science Conference. A biennial conference unique in that it is a forum for scientists of the Department of the Army to present outstanding papers before key military and civilian leaders of DoD and other government agencies.

2. General Conference Support. This area includes support of conferences for which funds are not otherwise available, but which are judged worthy of support in terms of overall benefit to the Army.

3. Science Youth Activities. This task area includes:

a. Junior Science & Humanities Symposia. A series of regional symposia culminating in the annual National JSH Symposium. The regional symposia are conducted by the Army in conjunction with institutions of higher learning, with partial support provided by industry. The National JSH Symposium is jointly supported and participated in by the U.S. Office of Education. The purpose of these symposia is to encourage high school science students to pursue careers in science. The students present research papers at the regional symposia. Winners selected at the regional symposia attend the National Symposium with all expenses paid by the Army. At the National Symposium, students attend lectures by prominent scientists, and participate in special discussion groups conducted by professional scientists.

b. Science Fairs. A series of regional, state and international fairs for the display of student projects of a scientific nature. The Army participates in these fairs at two levels, as follows:

(1) Regional and State Science Fairs. The Army assigns judges from Reserve R&D units within 100 miles of each fair. Where no such units are available, Fair Directors are requested to represent the Army, and to seek assistance from regular Army establishments when possible. Certificates of Achievement are awarded to students who enter outstanding displays. Augmentation of these awards by local Army units and Army associations is encouraged.

(2) International Science Fairs. The Army selects a panel of judges from civilian and military scientists of various R&D laboratories. Awards at this level consist of Certificates of Achievement, all-expense paid one-week tours of Army laboratories, and offers of summer employment. As a special award, a principal (and alternate) representative of the Army is selected to attend the Japan Student Science Awards (JSSA) Exhibit in Tokyo with expenses paid. This special award, known as the Operation Cherry Blossom Award, is a joint service undertaking. The Navy and Air Force also select representatives to attend the JSSA at the same time.

2.2.4 Administration and Management

Office, Chief of Research & Development, CRDSTI, programs and provides funds for the SC project and maintains staff supervision.

Office, Chief of Research & Development, CRDSTI, plans, coordinates and manages the Army Science Conference, and publishes the proceedings.

Office, Chief of Research & Development, CRDSTI, is the DA office of record and focal point for coordination, review and approval of Army sponsored and cosponsored scientific and technical conferences (approval is required for conferences with foreign attendees).

Management and execution responsibility for the Junior Sciences and Humanities Symposia have been assigned to the U.S. Army Research Office-Durham.

Office, Chief of Research & Development, CRDSTI, is responsible for Army participation in the Science Fair Program. The Science Fairs are administered by Science Service, Inc., a non-profit organization in Washington, D. C.

2.2.5 Accomplishments

1. Army Science Conferences have been conducted at the U. S. Military Academy, West Point, N.Y., in 1957, 1959, 1962, 1964 and 1966. A sixth Army Science Conference will be conducted in 1968.

2. From 40 to 50 conferences of all types have been coordinated and/or reviewed and approved each year.

3. The Army has sponsored regional Junior Science and Humanities Symposia each year from 1960 to 1967. National JSH Symposia have been sponsored each year from 1963 to 1967. Both the regional and the national JSH symposia will be sponsored in 1968.

4. The Army has participated in the Science Fair program each year from 1958 to 1967. It will participate again in 1968.

2.3 Chemical Information and Data System (CIDS)

2.3.1 Purpose, Objective and Scope

The Chemical Information and Data System (CIDS) is an exploratory development project with the overall objective of defining the requirements for an integrated system for acquiring, storing, searching and retrieving chemical information and data in support of Army RDT&E programs.

2.3.2 Basic Concept

In concept, this system will consist of one or more centralized computerized data banks in which information can be stored and searched on the basis of user-oriented needs; queries to the bank would be from remote sources, and answers to the points of query from the computer(s) would be on a real-time basis. Work to date has provided a computerized data file of sufficient magnitude, and the executive and search routines of sufficient complexity, to function satisfactorily in a test program context.

2.3.3 Task Areas

Intensive work is under way in four general areas to support scientific and technical "bench level" Army programs:

1. Increasing existent file holdings to provide a broader chemical data base against which to search.
2. Determining keys of a non-structural nature to satisfy requirements for searches deeper than those presently possible, which are based specifically on chemical structures and substructures.
3. Pilot operation of the system in a limited communications network in selected mission-areas, and logging those operations to develop parameters for an overall system design.
4. Assessing equipment and techniques within the state of the art, and testing those most promising during the pilot phase to determine functional and economic feasibility relative to a fully operational system.

2.3.4 Administration and Management

Office, Chief of Research and Development, CRDSTI, programs and provides funds for CIDS, and maintains staff supervision of the project.

Management and execution responsibility for the CIDS project is assigned to the Army Materiel Command, which has delegated the responsibility to the Army Munitions Command.

The Munitions Command has assigned the CIDS project to Edgewood Arsenal, Maryland, for execution.

2.3.5 Accomplishments

1. An experimental chemical compound test file containing 300,000 organic compounds has been established, and file building efforts are continuing (there are approximately 3,500,000 known chemical compounds).

2. A CIDS User Advisory Group test of the CIDS experimental system in October 1967 indicated that it was more than 50% responsive to sample chemical queries from Army users although it contained less than 10% of the known compounds.

3. Plans were initiated in December 1967 to coordinate the CIDS 300,000-compound experimental test file with the CIRS 123,000-compound semi-operational test file of The Surgeon General.

4. Six other Federal agencies began to participate in the CIDS experimental test program in January 1968.

5. A working arrangement was established in January 1968 between the CIDS project and the chemical information project of the Chemical Abstracts Service (CAS).

2.4 Engineering Data Storage & Retrieval (EDSR)*

2.4.1 Purpose, Objective and Scope

The Engineering Data Storage & Retrieval (EDSR) Project is an exploratory development project with the objective of defining requirements for the design of engineering data systems that will improve the flow of engineering information to engineers engaged in Army RDT&E activities. Important objectives are to reduce lead time, and to eliminate duplication of effort.

2.4.2 Basic Concept

The pilot version of the Nuclear Weapons Engineering Data System (NWEDS) has been selected for optimization and further development. The primary elements of this system are magnetic tapes and tabulating cards for digital data storage; 35 mm film mounted on aperture cards and documents in their original form for document image storage; and binary coded 16 mm film for the data retrieval.

2.4.3 Task Areas

Optimization and further development of the system will proceed in three task areas:

1. Optimization of the system (Intermediate Range). This effort will include the determination of data requirements, data collection, hard copy to roll film, film processing, data retrieval, aperture card to roll film conversion, and aperture card or tab card to roll film conversion.

2. Optimization of the System (Long Range). This effort will include magnetic tape to roll film conversion, data transmission, collation of digital and graphic data, use of optical scanner, use of video tape, roll film to magnetic tape conversion, and roll film to laser holographic conversion.

3. Data exchange The value of the system to installations other than Picatinny Arsenal, and the use of this system for exchanging engineering data between Picatinny Arsenal and selected installations will be tested.

2.4.4 Administration and Management

Office, Chief of Research and Development, CRDSTI, programs and provides funds for EDSR and maintains staff supervision of the project.

Management and execution responsibility for the EDSR project is

*Former EDIS Project

assigned to the Army Materiel Command, which has delegated responsibility to the Army Munitions Command.

The Munitions Command has assigned the EDSR project to Picatinny Arsenal for execution.

2.4.5 Accomplishments

1. An Engineering Data & Information System Concept and Action Plan was prepared (Ref. 1).

2. A recommended approach to the design of a U.S. Army Engineering Data & Information System was issued (Ref. 2).

3. A generalized conceptual model for an Engineering Data & Information System was developed (Ref. 3).

4. The types of engineering data being collected were identified (Ref. 5).

5. The available engineering data and information were categorized (Ref. 6).

6. The engineering user needs were identified (Ref. 7).

7. The engineering disciplines and fields were identified (Ref. 8).

8. The existent engineering data systems were categorized (Ref. 9).

9. A proposed Nuclear Weapons Engineering Data System was selected for optimization and further development (Ref. 10). This system has the following advantages:

a. It provides a means of storing a wide variety of engineering data and information.

b. It allows the engineer to retrieve the desired information within minutes.

c. It makes the greatest use of handling procedures already authorized by DoD.

d. It provides standards and regulations for data management, with emphasis on user autonomy.

2.5 Information and Data Exchange Experimental Activities (IDEEA)

2.5.1 Purpose, Objective and Scope

The Information & Data Exchange Experimental Activities (IDEEA) is an exploratory development project established to acquire and analyze data derived from live experimentation on a controlled experimental information network for the purpose of determining user needs for improved technical information systems, specifying the characteristics of future technical information systems, and assessing the cost-effectiveness of such systems.

2.5.2 Basic Concept

Established as a means of answering basic questions concerning systems usage and network planning, the IDEEA approach involves experimentation within an information network by a limited group of scientists, engineers, technicians and managers. Further, it establishes an experimental information network, computer-linked and polymorphic in nature, which is capable of supporting network experiment requirements.

2.5.3 Task Areas

The following functions will be performed by the IDEEA project:

1. Establish an experimental system, the IDEEA network.
2. Provide for the measurement and analysis of the experimental operation to include usage patterns, data rates and volumes, error analysis, traffic patterns, and response relevance.
3. Support research in the areas of linguistics, computer programming, man/machine interface problems, analysis, and advanced information concepts.
4. Specify the basis for the data automation requirements for an operational system.
5. Develop specifications for interfaces with technical information and management information systems.

2.5.4 Administration and Management

Office, Chief of Research and Development, CRDSTI, programs and provides funds for IDEEA, and maintains staff supervision of the project.

Management and execution responsibility for the IDEEA project is assigned to the Army Materiel Command, which has delegated the responsibility to the Army Munitions Command.

The Munitions Command has assigned the IDEEA project to Frankford Arsenal, Philadelphia, Pennsylvania, for execution.

2.5.5 Accomplishments

1. Commercial version of Army Chemical Typewriter developed.
2. IDEEA station developed which employs Army Chemical Typewriter. FADAC Computer Units, and associated equipment.
3. First IDEEA Station operational at Frankford Arsenal.
4. Multi-FADAC station operational at Frankford Arsenal.
5. Second IDEEA Station installed at Edgewood Arsenal.
6. Third, Fourth and Fifth IDEEA Stations being constructed.
7. IDEEA Station Software Package under development.
8. Two-station IDEEA network checkout complete.
9. Limited Experimental Program begun on two-station network.

2.6 Technical Information Functions and Activities (TIFA)

2.6.1 Technical Information Analysis Centers (TIAC)

2.6.1.1 Purpose, Objectives and Scope

The Technical Information Analysis Center (TIAC) task has been established for the purpose of assisting Army components with the establishment of centers of excellence for various disciplines, or mission-oriented functions, in order to provide prompt response to user requests for technical information.

2.6.1.2 Basic Concept

Technical Information Analysis Centers provide the expertise necessary:

1. To respond to specific discipline or mission-oriented questions.
2. To prepare periodic summaries or reviews of research areas.
3. To develop guidelines for future research by identifying those areas where research is necessary in order to close knowledge gaps.
4. To provide a specialized collection of documents available for on premises use by qualified personnel.

2.6.1.3 Task Areas

1. Proposals for new Army Centers are evaluated and studies are initiated to determine the need within the Army scientific and engineering community for the establishment of specialized centers.
2. When the need for a new Center within the Army is justified, assistance is provided for its establishment.
3. Activities of existing Army Centers are reviewed annually to determine the contribution being made to the Army and the DoD community.

2.6.1.4 Administration and Management

Office, Chief of Research and Development, CRDSTI, programs and provides initial funding support and coordination of requirements for the establishment of new centers, and maintains staff supervision of established centers.

The developing agencies program and provide funds for the established centers.

2.6.1.5 Accomplishments

1. Assistance was provided for the establishment of five (5) Army Technical Information Analysis Centers in 1964 and monitoring of the activities of these Centers is continuing:

<u>Name of Center</u>	<u>Location of Center</u>	<u>Monitoring Agency</u>
Cultural Information Analysis Center	American University Center for Research in Social Systems, 5010 Wisconsin Ave, NW, Washington, D.C.	The Chief of Research & Development
Military Entomology Information Service	Walter Reed Army Medical Center Forest Glen Section Washington, D. C.	The Surgeon General
Human Engineering Information & Analysis Service	Tufts University Systems Building, Medford, Mass.	Commanding General US Army Materiel Command
Nondestructive Testing Information Analysis Center	Watertown Arsenal Watertown, Mass.	Commanding General US Army Materiel Command
Plastics Technical Evaluation Center	Picatinny Arsenal Dover, New Jersey	Commanding General US Army Materiel Command

2. Proposals for new Centers have been submitted and evaluated, but no additional Centers have been approved.

2.6.2 Army Research and Development Information System (ARDIS)

2.6.2.1 Purpose, Objectives and Scope

The purpose of the Army Research & Development Information System (ARDIS) task is to develop a system which will provide Army R&D project managers with timely, accurate and relevant technical and financial management information. This objective is to be accomplished by establishing an organized file of relevant information utilizing automated techniques as necessary. The system will use standard data elements, be compatible with other related information systems, and be developed on a subsystem-by-subsystem (file-by-file) basis.

2.6.2.2 Basic Concept

ARDIS is intended to be a comprehensive system to support the management process of planning, programming, budgeting, executing, monitoring and analyzing the RDT&E effort. It will consist initially of eight (8) interrelated subsystems; each designed to meet specific management information requirements. Four (4) of the subsystems focus on R&D work requirements and performance information. The other four (4) subsystems are oriented toward resource availability and utilization information (Fig. 5).

2.6.2.3 Subsystems

The initial work plan for ARDIS includes the development and operation of eight (8) subsystems:

1. Requirements for Work, which will provide data for planning current and future RDT&E projects. This subsystem will provide information relating to projects and tasks as set forth in the Army Strategic Plan, Army Force Development Plan and Army Research Plan. Initially, this subsystem will provide automated control of the approved Combat Development Objectives Guide (CDOG), which will include Operational Capability Objectives (OCO's), Qualitative Materiel Development Objectives (QMDO's), Advanced Development Objectives (ADO's), Qualitative Materiel Requirements (QMR's) and Small Development Requirements (SDR's). Plans are to expand this subsystem to capture data elements relating to proposed new requirements. The objective is to devise an automated means for rapidly searching the Ongoing Work and Results of Work files to determine if a relationship exists between the new requirements and existing or past efforts.

2. Proposed Work, which will provide data for and between industry and government, and control/coordination of unsolicited proposals. At present, government agencies receive proposals from industry to perform research and development. In many instances, these proposals

ARMY RESEARCH AND DEVELOPMENT
INFORMATION SYSTEM

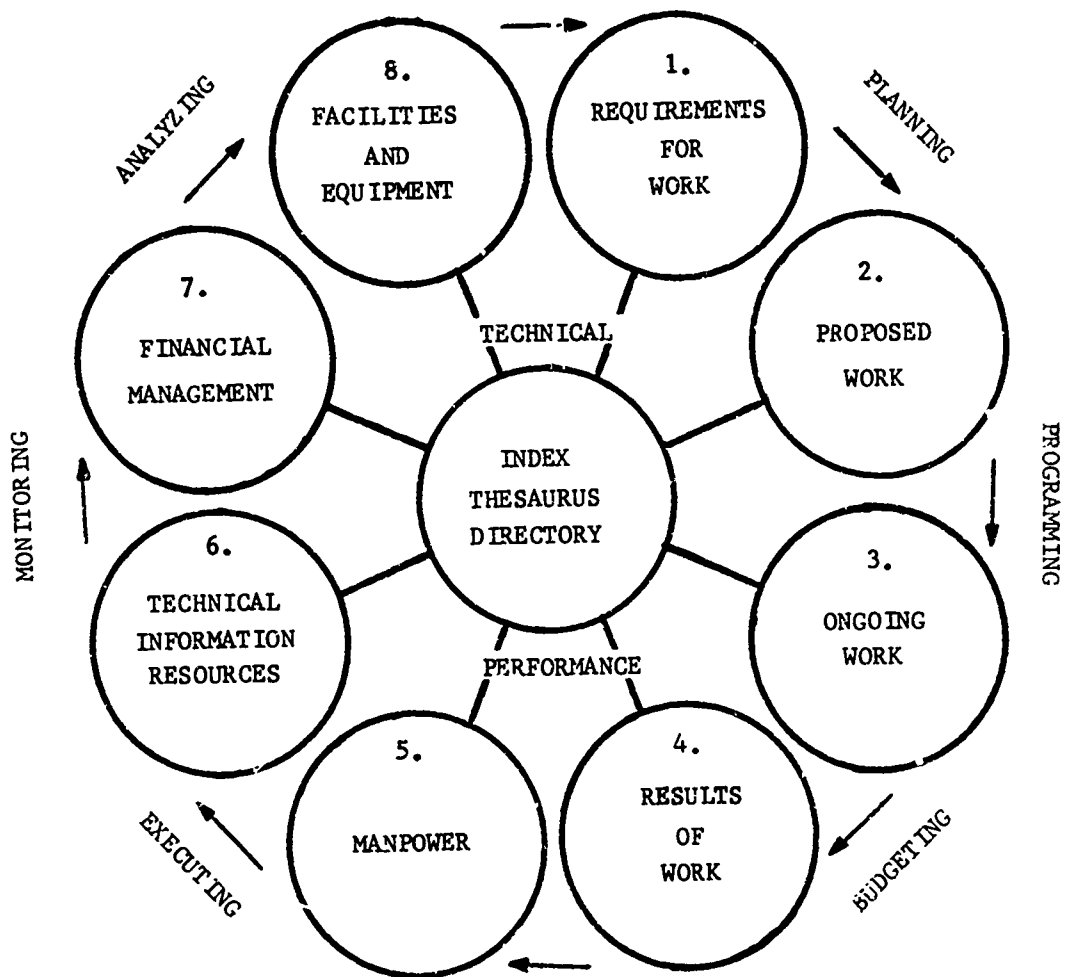


FIGURE 5

do not come to the attention of other government agencies having a need for them. Initially, this subsystem will be designed to provide control and coordination of these proposals. The handling of unsolicited proposals received as a result of the Qualitative Development Requirements Information (QDRI) program will be given first consideration.

3. Ongoing Work, which will provide data and information on research and technology currently in progress. This subsystem will provide timely administrative and technical information for each currently approved RDT&E project. The Research and Technology Resume (DD Form 1498) provides administrative and technical information for research and exploratory development projects. A similar resume will be used to provide essential administrative and technical information for selected projects in the other RDT&E categories.

4. Results of Work, which will provide information on RDT&E work accomplished. At present, the Document Control Data Sheet (DD Form 1473) provides required administrative and technical information concerning the contents of each technical report. Technical reports describe the results obtained from R&D projects. Administrative and technical information in these reports provides a basis for work performance measurement.

5. Manpower, which will provide a register of professional skills and administrative manpower information. The manpower subsystem will provide a register of professional skills by education, current assignment, past experience and other specialized interests that are available throughout the RDT&E community. It serves as a basis for effective distribution of RDT&E results information. This subsystem will provide required administrative manpower information.

6. Technical Information Resources, which will provide information on personnel, facilities and funding as applied to the conduct of scientific and technical information activities. This subsystem will provide the Department of the Army with information on number of personnel, facilities and funding applied to the conduct of scientific and technical information activities, including the identification of technical information handled by the Army, the operations performed on this information, and the various media, forms, formats and languages used to represent this information. This subsystem will serve as a primary source of information for meeting current requirements and for planning and coordinating the scientific and technical information systems and technical information systems and activities.

7. Financial Management, which will provide financial data concerning current work and planned accomplishments. This subsystem will provide financial information required to support the Army RDT&E program. Data elements supporting command schedule reporting requirements, the

status of the approved programs and changes to the planned program will be included in this subsystem. In addition, data elements identifying the relationship between the total RDT&E program and Five-Year Defense Program (FYDP) will be captured. The subsystem will be updated, based on changes in accounting policies and procedures, to meet the needs of management. Existent and future regulations will provide the discipline for meeting the accounting information needs.

8. Facilities & Equipment, which will contain data concerning RDT&E facilities and equipment. This subsystem will provide vital information relating to facilities and equipment that influences the RDT&E program.

2.6.2.4 Administration and Management

Office, Chief of Research & Development, CRDSTI, programs and provides funds for the ARDIS project. Staff supervision is maintained by a DA Steering Committee, Management of ARDIS is vested in a DA Working Group.

2.6.2.5 Accomplishments

1. The ARDIS parameters, priority considerations, and the essential system analysis for Subsystem 7, Financial Management, were initiated in FY 67 by a DA ARDIS Working Group based on guidance and direction provided by the DA ARDIS Steering Committee. Initial ARDIS development emphasis was given to this subsystem. The system design for a portion of this subsystem was completed and published (TAG letter of 17 May 1967) for compliance by developing agencies. A portion of this subsystem will be operational during May 1968, with total subsystem completion scheduled for September 1968.

2. Data banks for Subsystem 3, Ongoing Work; Subsystem 5, Manpower; and Subsystem 6, Technical Information Resources, were established previously on an experimental basis by the TIFA project. Under the ARDIS concept, these subsystems are being updated and expanded, and will become fully operational and integrated into the system.

3. Work has been initiated to accomplish the necessary systems design, test and evaluation of the remaining subsystems of ARDIS with the exception of Subsystem 8, Facilities and Equipment, which has been deferred.

APPENDIX A
BIBLIOGRAPHY

	Page
1. Army Technical Library Improvement Studies (ATLIS)	37
2. Symposia and Conferences (SC)	39
3. Chemical Information & Data System (CIDS)	41
4. Engineering Data Storage and Retrieval (EDSR)	43
5. Information Data Exchange Experimental Activities (IDEEA)	44
6. Technical Information Analysis Centers (TIAC)	45
7. Army Research & Development Information System (ARDIS)	53

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1. Bibliographies have been issued to selected users on the following subjects:

- Allergy (arthropod associated)
- Dermatitis (pesticide and arthropod-associated)
- Arthropod Venoms
- Hymenoptera
- Rodent Control
- Aircraft Dispersal and Disinfection
- Anti-malarial Drugs
- Arborviruses
- Chagas Disease
- Cockroach Control
- Dispersal Equipment
- Entomology Training
- Hazards of Pesticides to Man
- Mosquito Biology
- Control of Stored Products Arthropods

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APPENDIX B
MILESTONE CHARTS

	Page
1. Army Technical Library Improvement Studies (ATLIS)	56
2. Symposia and Conferences (SC)	57
3. Chemical Information and Data System (CIDS)	58
4. Engineering Data Storage and Retrieval (EDSR)	59
5. Information & Data Exchange Experimental Activities (IDEEA)	60
6. Technical Information Analysis Centers (TIAC)	61
7. Army Research & Development Information System (ARDIS)	62

1. ARMY TECHNICAL LIBRARY IMPROVEMENT STUDIES (ATLIS)

Project - 2P020401A728

TASK 01 - Management and Technical Direction

- WU 001 - Technical Library Problem Identification
- WU 002 - Project Coordination and Technical Supervision

TASK 02 - Library Operations

- WU 001 - Criteria for Operational Standards
- WU 002 - Dissemination of Library Operational Information
- WU 003 - Preparation of Library Regulatory Publications Guide
- WU 004 - Interlibrary Mutual Support
- WU 005 - Standard Operating Procedures for Technical Library Services
- WU 006 - Central Catalog
- WU 007 - Detailed Indexes for Specialized Collections
- WU 008 - Users Guide to Library Services
- WU 009 - Technical Library Personnel Training
- WU 010 - Non-Computer Mechanized Support for Army Technical Libraries
- WU 011 - Technical Library Resources Directory

56

TASK 03 - Library Services

- WU 001 - Initial Distribution of Technical Publications
- WU 002 - Library Services Automation
- WU 003 - Installation Selective Dissemination Plan
- WU 004 - Procurement and Distribution of Advance Abstracts
- WU 005 - Interface with Other Information Systems
- WU 006 - Library and Information Sciences Information Center
- WU 007 - Techniques and Guidelines for Management of Classified Document Collections in DoD Libraries
- WU 008 - Automation of Library Services

TASK 04 - Advanced Technology

- WU 001 - ABC Information Storage and Retrieval System
- WU 002 - Research and Development in Information Science

FY 68	FY 69	FY 70	FY 71	FY 72
	Combined with 004			
	Completed FY 67			
	Completed FY 67			
	Combined with 008			
	Completed FY 67			

2. SYMPOSIA & CONFERENCES (SC):

Project - 2P020401A729

TASKS

Army Science Conference
U. S. Military Academy

General Conference Suppo.
Army-wide

Junior Science & Humanities Symposia
Regional & National

Science Fairs
Regional, State & International

- SC - ARMY SCIENCE CONFERENCE
C - CONFERENCES
R - REGIONAL
N - NATIONAL
S - STATE
I - INTERNATIONAL

FY 68	FY 69	FY 70	FY 71	FY 72
SC	---	SC	---	---
C C C C C C C C	C C C C C C C C	C C C C C C C C	C C C C C C C C	C C C C C C C C
RRN	RRN	RRN	RRN	RRN
RSI	RSI	RSI	RSI	RSI

3. CHEMICAL INFORMATION & DATA SYSTEM (CIDS)

PROJECT - 2P020401A727

TASK 01 - Project Management and File Orientation

- WU 001 - Project Supervision, Liaison and Control
- WU 002 - Orientation Programs in Support of R&E Efforts

TASK 02 - Exploratory Development

- WU 001 - ADF Support of Resch & Engrg at Edgewood Arsenal
- WU 002 - Investigate & Incorporate Non-Structural Data Into Files
- WU 003 - Refinement of Search Strategies
- WU 004 - Attain On-Line, Real-Time CIDS Capability
- WU 005 - Assess & Install New I/O Hardware & Techniques
- WU 006 - Refinement of Automated Creation of Search Keys
- WU 007 - Augmentation of Structural Data Files
- WU 008 - Computer Manipulation of Differentiated Data
- WU 009 - Storage & Retrieval of "Non-Classical" Compounds
- WU 010 - Test Assessment of Notation Methodologies
- WU 011 - Relation & Interaction of CIDS with Other Systems
- WU 012 - Develop & Publish CIP Handbooks as Desktop Tools
- WU 013 - Establish Procedures & Programs for Handling Classified Information
- WU 014 - Investigate Application of Computer Graphics

TASK 03 - Data File Expansion

TASK 04 - Reprogramming to Higher-Level Language

TASK 05 - Systems Test & Evaluation

TASK 06 - Systems Engineering

- WU 001 - Prepare Specifications for Communications Network
- WU 002 - Develop SOP's, Regulations for System Operation
- WU 003 - Justify Requirements for Peripheral Communications Control Computers
- WU 004 - Acquire, Install Total System Comm. Hardware

	FY 68	FY 69	FY 70	FY 71	FY 72
TASK 01					
WU 001					
WU 002					
TASK 02					
WU 001					
WU 002					
WU 003					
WU 004					
WU 005					
WU 006					
WU 007					
WU 008					
WU 009					
WU 010					
WU 011					
WU 012					
WU 013					
WU 014					
TASK 03					
TASK 04					
TASK 05					
TASK 06					
WU 001					
WU 002					
WU 003					
WU 004					

PROJECT - 2P020401A726

TASK 01 - Management & Control

TASK 02 - NWEDS* Optimization (Intermediate Range)

WU 001	- Data Requirements
WU 002	- Data Collection
WU 003	- Hard Copy to Roll Film
WU 004	- Film Processing
WU 005	- Data Retrieval
WU 006	- Aperture Card/Roll Film Conversion
WU 007	- Aperture Card & Tab Card, Roll Film Conversion

TASK 03 - NWEJS Optimization (Long Range)

WU 001 - Magnetic Tape to Roll Film
WU 002 - Data Transmission
WU 003 - Collating Digital & Graphic Data
WU 004 - Use of Optical Scanner
WU 005 - Use of Video Tape
WU 006 - Roll Film/Magnetic Tape Conversion
& Retrieval
WU 007 - Roll Film/Laser Holographic Conversion
& Retrieval

TASK 04 - Data Exchange

* NUCLEAR WEAPONS ENGINEERING DATA SYSTEM

[illegible]

5. INFORMATION & DATA EXCHANGE EXPERIMENTAL ACTIVITIES (IDEA)

PROJECT - 2P020401A730

TASK 01 - Management and Direction
 WU 001 - Direction & Coordination
 WU 002 - Network Control

TASK 02 - Network Implementation
 WU 001 - Hardware Completion
 WU 002 - Demonstration Software
 WU 003 - User Training & Indoctrination

TASK 03 - Operating System Development
 WU 001 - Communication Teleprocessing Programs
 WU 002 - Query Routines & Dialog Techniques

TASK 04 - S&TI Subsystems Support
 WU 001 - CIDS Support
 WU 002 - ARDIS Support

TASK 05 - Experimentation
 WU 001 - Design of Experiment
 WU 002 - Data Logging
 WU 003 - Evaluation

TASK 06 - Specifications for S&TI Systems
 WU 001 - Information Sources
 WU 002 - User Requirements
 WU 003 - System Characteristics

TASK 07 - Supporting Studies
 WU 001 - I/O Devices
 WU 002 - Graph Theory Techniques
 WU 003 - Mathematics Research

	FY 68	FY 69	FY 70	FY 71	FY 72
TASK 01 - Management and Direction					
WU 001 - Direction & Coordination					
WU 002 - Network Control					
TASK 02 - Network Implementation					
WU 001 - Hardware Completion					
WU 002 - Demonstration Software					
WU 003 - User Training & Indoctrination					
TASK 03 - Operating System Development					
WU 001 - Communication Teleprocessing Programs					
WU 002 - Query Routines & Dialog Techniques					
TASK 04 - S&TI Subsystems Support					
WU 001 - CIDS Support					
WU 002 - ARDIS Support					
TASK 05 - Experimentation					
WU 001 - Design of Experiment					
WU 002 - Data Logging					
WU 003 - Evaluation					
TASK 06 - Specifications for S&TI Systems					
WU 001 - Information Sources					
WU 002 - User Requirements					
WU 003 - System Characteristics					
TASK 07 - Supporting Studies					
WU 001 - I/O Devices					
WU 002 - Graph Theory Techniques					
WU 003 - Mathematics Research					

6. TECHNICAL INFORMATION ANALYSIS CENTERS (TIAC)

PROJECT 2P020401A720

Cultural Information Analysis Center
American University

Military Entomology Information Service
Walter Reed Army Medical Center

Human Engineering Information & Analysis Service
Tufts University

Nondestructive Testing Information Analysis Center
Watertown Arsenal

Plastics Technical Evaluation Center
Picatinny Arsenal

R - ANNUAL REPORT (REQUIRED)

FY 68	FY 69	FY 70	FY 71	FY 72
-R - -	-R - -	-R - -	-R - -	-R - -
-R - -	-R - -	-R - -	-R - -	-R - -
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-R - -	-R - -	-R - -	-R - -	-R - -
-R - -	-R - -	-R - -	-R - -	-R - -

Project - 2P020401A720

Subsystem 1 - Requirements for Work

Subsystem 2 - Proposed Work

Subsystem 3 - Ongoing Work

Subsystem 4 - Results of Work

Subsystem 5 - Manpower

Subsystem 6 - Technical Information Resources

Subsystem 7 - Financial Management

Subsystem 8. - Facilities & Equipment *

* Development Held in Abeyance

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APPENDIX C

FUNDING

	Page
Table 1. U.S. Army Research & Development Information Program	65
Table 2. U.S. Army Research & Development Information Projects	66
Table 3. Army Technical Library Improvement Studies (ATLIS)	67
Table 4. Symposia & Conferences (SC)	68
Table 5. Chemical Information & Data System (CIDS)	69
Table 6. Engineering Data Storage & Retrieval (EDSR)	70
Table 7. Information & Data Exchange Experimental Activities (IDEEA)	71
Table 8. Technical Information Functions & Activities (TIFA)	72

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13. ABSTRACT Pertinent aspects of the U.S. Army Research and Development Information Program are delineated, including the program initiation bases and scope; purpose, objectives, and guidelines; value and benefits; basic concept; and project inter-relationships. Illustrative figures are included. The projects of the U. S. Army Research and Development Information Program are described, including their purposes, objectives and scopes; basic concepts; task areas; and the respective administrative and management assignments. Project accomplishments are listed. A bibliography of project reports and milestone charts showing tasks, work units, and performance periods are provided.		

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